preventing them from acting as a ferment to the rest of the water. Certain it is, that if a quantity of charcoal is thrown into water which has been long kept, or has become foul by being in contact with putrid substances, the water will become sweet in the course of a few hours: it should be perfectly well-burnt, and kept from exposure to the atmosphere; if good, when pulverised, it will sink rapidly in the water. This property in charcoal, of resisting the action of putridity, has led to charring the inner surfaces of casks for containing water during long voyages. That its conservative power was known in very early times we have evidence in the ancient practice, still in use, of charring the points of piles and stakes intended to be driven in the ground. Water has been preserved, it is said, for seven years, by adding to it oxide of manganese, in the proportion of 1½ to 200, and agitating the liquid once a fortnight.

A knowledge of the pressure and motion of homogeneous fluids is essential to the proper disposition and proportionment of all hydraulic apparatus: where these are on an extensive scale, it will often obviate very serious mishaps. In obedience to the law of terrestrial attraction, otherwise gravitation, water, like other bodies, naturally presses downwards; but besides being subject to this general law, it is governed by another—that of equal pressure, which urges it alike in all directions; owing to that want of cohesion among its parts which is the characteristic of fluids. Pressure in proportion to its vertical height is a leading feature, and suggests, that the deeper we make a cistern, with a due regard to the strength of its several parts, to withstand the lateral pressure of its contents—if at the same time we lower the outlet—the more efficient will be the discharge. This last principle is one which should be held prominently in view; it makes no difference as to pressure whether we plunge our hand into water in an ordinary vessel, or to the same depth in the sea; the boundless ocean, when still, presses with no greater force against a sea-wall, than the water in a reservoir of equal depth does against its side—the force being ever as the depth, quite irrespective of breadth.

Since all parts at an equal depth press equally in all directions, and the pressure is as the depth, if we suppose a given thickness at the bottom of the side of a rectangular cistern, full of water, to be adequate to the lateral pressure at that level, then a straight line drawn from the outer extremity of that thickness at bottom up to the inner extremity at top, will give sectionally a tapering boundary, whose varying thickness will be everywhere adequate to the pressure at whatever level. Hence, the average pressure will be in the middle of the height, at the centre of gravity; and the deficiency above that point being just compensated by the excess below it, the pressure diffused over the entire side will be in the ratio of the average pressure; consequently, as every point in the base is loaded with a weight equal to the force which presses against the bottom of the side, or to the entire weight of the fluid, it follows, that when the bottom is equal to the square of the height, otherwise when the cistern is a cube, the weight on the bottom will be to the pressure on the side as the bottom is to half the side, that is just double; and as a necessary sequence, it will be to the pressure on the whole four upright sides as the bottom is to the entire upright surface, that is just half; this we say in the case of a cube, for it is obvious that the same proportions will not hold good in other cases, although their ratio will.

To find the load on the bottom of a cistern, multiply the cubical contents in feet by 1,000, and divide the product by 16, which will give first the ounces, then the pounds avoirdupois; or multiply by 635 which will at once give the pounds; then as the imperial gallon of water weighs 10 lbs., divide by that number if the quantity in gallons is required. To find the pressure against the vertical sides, multiply their area by half the depth, and the product will be cubic feet, whose weight is equal to the pressure. For computing the contents in various curvilinear forms, it is convenient to know that the cubic foot,

containing	*exactly*	1728 cubic inches,
contains	*very nearly*	2200 cylindrical inches,
	or	3300 spherical inches,
	or	6600 conical inches;

thus, a vessel of any of these forms, having its height and the square of its diameter multiplied into each other, and the product being divided by the number given, the quotient will be its contents in cubic feet. It will be seen that it embraces the cylinder, and is, therefore, applicable to ascertaining the contents of pipes, wells, &c.; also that the load on the bottom is thus ascertained. The pressure against the cylindrical or vertical surface of the latter, as in the case of a vessel of rectilinear figure, is found by multiplying the area of the upright surface by the depth of the centre of gravity, or half depth of the liquid—both in feet—the product being the effective pressure. The pressure in a hemisphere is found by multiplying the spherical surface by half the depth of the water.*

The law of equilibrium being established, it follows that the load on the base may, under particular circumstances, exceed the weight of the fluid contained; for supposing the vessel to be in the form of a frustrated cone or pyramid, and full, the deficiency of fluid in the parts surrounding the uninterrupted column in the centre, will be compensated by the resistance of the sides, causing the fluid, since it cannot recede from that force, to press in the direction of it. If the pressure in those parts were at any time less than it was elsewhere, the fluid would move towards them, and not become quiescent till the equilibrium was established; and hence the pressure every where the same. The pressure, then, being as the maximum height, the base of the cone or pyramid, has to sustain every where a load equal to that which acts on its centre.†

JAMES WYLSON.

* The relation which the diameter of the circle bears to its circumference: | is nearly as 1 to 3·14159, or a little less
On which the square of the diameter of a sphere bears to its surface: | than three and 3-99ths.
On which the curved surface of a cylinder bears to the product of its length multiplied by its bore.

The square contents of the area of a circle will be found by multiplying the circular contents (obtained by squaring the diameter) by the decimal ·7854.

† To be concluded in our next.

THE YOUNG ARCHITECTS OF ENGLAND.

BY ONE OF THEMSELVES.

SIR,—Had we a Thackeray in *our* world, like him with whom the world of "snobs" is blest—or curst—to trumpet forth its secrets, doubtless said world of ours is rich enough in fun to furnish some most sapid subjects for his kitchenry.

Your last week's leader, Sir, leads me to this train of thought; your shrewd remark, that certain letters of the young and rising are chiefly remarkable, after "exclusive attention to pointed architecture," for, secondly, "great *self-conceit*," has here set one of the youngsters to think that a few words on the same subject, more closely directed, might serve a good end.

Perhaps, Sir, you may see in these very lines of mine the marks of the very "self-conceit" (homely but serviceable phrase!) which you seem so to deprecate. If so, I am shameless enough to glory in it, and to be in but little pain as to how much choler it may excite, or how much cold disdain it may receive. Self-conceit, Sir, is a valuable thing: I should have but poor hopes of your editorship if I thought you lacking in the same. The words of a friend, a man of eminence in the literary world, I think are good: "Self-conceit," says he, "is a sillyhow that envelopes a man: puncture it, and the man dies." Look abroad upon the world, Sir, and you will find it so. Your conceited man is the man for obloquy now, and fame for ever. His self-conceit is his life-preserver. It is this remaining full-blown that buoys him up,—that keeps the often weary swimmer from yielding to the current—sinking down into the common world—drowning in the calm depths of insignificance. Thousands resign themselves to seeming fate, and sink, tired of the wind-troubled surface: a few struggle on, the storm still raging; their brethren are at rest—beneath; *they* are in tumult, but it is *above!* Your aim, Sir, ought to be, not to resist the "self-conceit" of the young and ardent, but to *guide* it. Will you permit me to attempt this task for you?

But, first, to vindicate the general tendency—the *spirit*—of Young Architecture (Young England, we have, Young Hickory, Young France, young every thing else; and wherefore not *Young Architecture*, then, in these bold radical days?)—to vindicate the spirit of Young Architecture, I must constrain myself to say (with all becoming reverence and awe for your authority) that I should have liked your leader better had it been amended by omitting from the words, "Where, first unadorned," to the words, "aerial rise," and substituting something of *argument* instead; seeing that the testimony of *poets* is no argument with Young Architecture. No wonder, Sir, that "our student friends look scornfully on the 'orders,'" when they—see—read of the "manly" Doric, the "decent matron" Ionic, the "wanton" Corinthian (O fie! "Shame! where is thy blush?), and the Composite thus made to be "of doubtful character," as some one says, and as we willingly allow; no wonder (to be serious) when we have this quoted, and find it believed in and acknowledged, that we, if we be *artists*, should "turn up our noses," as you have it, not at Sir Christopher Wren, but at such as wear his shape, and have none of his substance. Sir Christopher to one of these? "Hyperion to a satyr!" The dome of St. Paul's to the dome of the National Gallery!

Although I generally "go out into the same lobby" with Young Architecture (frequently "only more so," as the old joke hath it), I am not altogether one of the "student friends" whom you see fit, and justly too, to rate so soundly. I do *not* hold Michael Angelo "a man of very bad taste in architecture." * But neither do I agree in the inuendo of this, that "a Goth, for instance, is mistaken when from education, he imagines the architecture of his country to be the most perfect."† Instead of "turning *up* the nose" at Sir Christopher Wren, gladly will I turn that organ of expression, Sir, in any assigned direction whatever, if not personally inconvenient or contrary to statute,—any possible way you may direct whereby I may be understood to contribute to his honour and architectural glory. But at the same time, I would do likewise to him whom worthy Dr. Hutcheson above, in his innocence, calls "a Goth." And thus far you and I, Mr. Editor, I suppose mainly agree. But—*farther?* I hope much farther still, for although thus complacently inclined to give both their due, I do not hold myself bound by reverence for antiquity, to allow to either a single atom of weight *more* than his due. In short, I take Greek, and Roman, and Cinquecentist, and "Goth," and *every one else*, for just what I think him worth *and no more*. To bow to antiquity is to believe in ghosts and hobgoblins because we believed in them, in memory-hallowed "long, long ago," or because our grandmothers happen to believe in them still. *We* are the true *ancients* (it has been well said); our forefathers were younger as a world than we. But *Antiquity* is a thing that any one can comprehend who happens to keep sight of his arithmetic; while *Art*, and here is the key to much matter of wonderment,—*Art* is a thing which calls for more knowledge in him who would judge of it. The antiquarian-critic needs only to keep in view his "rules;" the artist-critic looks beyond these "rules" to principles of nature, and criticises (though to the bitter nausea of the orthodox) the very "rules" themselves. And Young Architecture, as I understand him, would be, *an artist;* and "the more so" that I (humbly) sometimes feel that he ought to be *more an artist than he is*. The drift of your leader, Mr. Editor, is (if you will allow me) to make him *less* an artist. Perhaps it is unintentionally so. If your principles of liberalism can be so far stretched as to tolerate one so latitudinarian as I, and to permit him to speak without the shadow of fear, boldly and honestly (although in all *decorum*, I will promise you) I should feel honoured in being allowed the medium of your journal for the development of the views I have now expressed, in a few sketches like the present; my object being simply to lead the student in our profession to go beyond *dogmas* to principles of reason. I am hardy enough to fancy that I have done so. And the result is, not that I love Greece and Italy, or Germany and England less, but that I love Nature more.

If, then, I may find favour in your editorial sight, I shall not be an anonymous writer (a

* Hosking—"Treatise on Architecture."
† Hutcheson—"Inquiry concerning Beauty and Virtue."

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